METHODOLOGY

There are four main measurements calculated in these studies. They include the number of on-site jobs, income from on-site jobs, property values on and around the site, and property tax revenues resulting from increases in property values. Following an explanation of the methodology used for each of these measures is a brief description of additional local economic impacts that might be considered in this type of study.

There may be discrepancies between the data provided in these fact sheets and data located elsewhere on the Superfund Redevelopment Initiative website. Figures provided here are a product of the methodology employed in this study and reflect the situation at these sites at a particular moment in time. Other studies on the Superfund Redevelopment Initiative website may have employed different methodologies at different points in time.

On-site Jobs

Cleaning up and subsequently redeveloping a site provides opportunities for local on-site jobs. Although redevelopment of sites does not necessarily create jobs, it does aid in keeping jobs local, which benefits the surrounding communities. If the site was not redeveloped into productive use, it is possible that the jobs would move to another location not benefitting the local community The number of jobs on-site was obtained through interviews with the on-site employer.

Income From On-site Jobs

Economic benefits from local jobs include the income from those on-site jobs and associated local spending. Having or maintaining local employment opportunities aids communities in remaining viable and productive places to live.

In these studies, information from the Bureau of Labor Statistics (BLS) National Employment, Hours, and Earnings Report was used to estimate wages. The most detailed Average Weekly Earnings (AWE) data was used based on industry classification by the North American Industry Classification System (NAICS). The NAICS has varying levels of classification used to determine AWE. The most detailed specific NAICS code available was used. In general, the formula for the total income from on-site jobs is:

$$Total\ Income = \sum_{NAICS} (Employees_{NAICS} * AWE_{NAICS} * 52 weeks)$$

Property Values

Increases in property values on and around a site often occur once a property has been cleaned up and redeveloped. There are two measurements covered here: the value of the site (on-site property values), which increases when it is remediated and redeveloped, and the value of the surrounding properties (off-site property values). These studies collected property data on the assessed value of on- and off-site properties.

Often times when properties have real or perceived contamination, their value may decline due to real or potential liabilities born by the property owner. After the on-site property is

investigated, remediated, and/or redeveloped into productive use, property values can rebound to pre-contamination levels, or even increase in value. In addition, there is extensive literature indicating that properties located near hazardous waste sites suffer from reductions and subsequent increases in value.

These studies collected property data on the assessed value of on-site and off-site properties. In most cases, a comparison was made between a pre-cleanup property value and a post-redevelopment value. The off-site property values were obtained for the quarter-mile or half-mile radius surrounding the site in the Superfund study.[1] Much of the literature that exists on the effects of hazardous waste sites on property value indicates that commonly the effects are found out to a distance of 2.5 miles and as far reaching as four miles.[2] Therefore, the distances used here were considered conservative and required a reasonable level of effort for data collection.

Although these studies do not claim to isolate the effect of site redevelopment on property values, they have collected individual parcel data for surrounding properties and calculated the changes in property values over a period of time reflective of changes in site use. Changes in on- and off-site property values were calculated using residential, commercial, and industrial property values for land and improvements collected from county assessors offices for individual properties on-site and in the surrounding area. A simple difference between property values after re-use and before or during cleanup were used in this calculation.[3]

While the availability of data from county or city assessors' offices can limit the years from which property value data is available, an attempt was made to find data for each site from a year after site discovery but prior to cleanup completion (i.e., early in the cleanup phase). This data served as the pre-cleanup (or benchmark) property value data. Data from the most recent assessment year was used to determine "after" redevelopment property value assessments.

Challenges with this approach included the availability and timing of historical assessments as well as property subdivision and consolidation over time. Tracking property parcels over time was extremely difficult and not possible in some jurisdictions without an extensive and costly title search. Due to the thousands of property parcels used in this study, property subdivisions and consolidations over time were only tracked for on-site parcels. In addition, each assessor's office had varying levels of available and reliable data. Consequently, these studies involved sending staff to work in person with these offices in order to collect the necessary data. In a few instances the assessor's office had systems that enabled them to extract and provide the needed data without sending someone to their office.[4]

Property Tax Revenues

In most jurisdictions, when property values rise, property tax revenues for the municipality also increase. Property taxes are an essential source of revenue that allow local communities to provide essential public services like schools, police, fire protection, sanitation, and infrastructure. Therefore, these studies looked at the changes in property taxes that resulted from the property value increase around and on the site. Increased property tax revenues were estimated by multiplying the change in aggregated on- and off-site property assessments by the local property tax rate. Keep in mind that slight adjustments were made to account for the fact that each jurisdiction had slightly different methods and rates for estimating property taxes and

the values to which they were applied.

Additional Measurements

Although there were only four main measurements calculated for these studies, there are multiple possible local economic impacts that could be captured. These include but are not limited to the following:

1. *Annual personal income tax revenue from on-site employment* – estimated using on-site income estimates and average state and/or local income tax rates.

2. *Annual personal spending resulting from on-site employment* – estimated using figures from the Bureau of Economic Analysis to determine disposable income as a fraction of total income and personal consumption expenditures as a fraction of disposable income.

3. *Annual sales tax revenue from personal spending associated with on-site employment* – estimated using annual personal spending, the state/local sales tax rates, and amount of spending subject to tax rate.

4. *Average annual retail sales from on-site businesses* – although individual businesses are unwilling to provide certain proprietary information such as individual store sales, estimates can be made regarding the average annual sales for sites in retail reuse. This information is obtained directly from the company representatives or in their annual reports and provides an average annual sales per store value.

5. *Annual sales tax revenue from on-site sales* – after estimating average annual sales, the state/local sales tax rates are used to estimate this value. This calculation assumes that all sales are subject to the sales tax. If used in conjunction with annual sales tax revenue from personal spending associated with on-site employment there is a potential to double-count the portion of employee spending and sales tax collection that occurs at on-site establishments. However, it is assumed that this percentage is small.

6. *Other tax collections* – depending on the type of on-site business, other tax revenues may be considered, such as:

- Gas tax revenues – when on-site establishment contains a gasoline station;
- Food & beverage tax revenues – when on-site establishment contains restaurants, etc., that are subject to an additional local tax;
- Lodging tax – if on-site property contains a hotel/motel.

1. In a few instances smaller radii were used. Due to the urban setting and therefore extremely large number of parcels along with resource constraints, it was not feasible to collect data for a radius of a quarter or half mile.

2. See for example:

Gayer, T., J. T. Hamilton, and W. K. Viscusi. 2002. The market value of reducing cancer risk: Hedonic housing prices with changing information. *Southern Economic Journal* 69 (2):266-289.

Ketkar, K. 1992. Hazardous-Waste Sites and Property-Values In the State of New Jersey. *Applied Economics* 24 (6):647-659.

Kiel, K., and J. Zabel. 2001. Estimating the economic benefits of cleaning up Superfund sites: The case of Woburn,

Massachusetts. *Journal of Real Estate Finance and Economics* 22 (2-3):163-184.

3. See the individual fact sheet supporting calculations for detailed examples.

4. An example of this is the *Gainesville, FL* site.